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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Great-Great-Grandad

See Page 314

A SCIENCE SERVICE PUBLICATION

ELECTRONICS

TV by Magnetic Tape

Attempts being made to develop methods of putting television programs on magnetic tape, a scheme that offers many advantages over movie film now used.

► TELEVISION ENGINEERS are striving to put video programs on magnetic tape. If they succeed, spot news may reach your screen in the future much faster than it gets there now by film.

Furthermore, if the engineers can iron out some of the technical wrinkles, tape-recorded programs probably will slash video station operating costs by doing away with the waste of used movie film.

To date, the much-talked-about system of recording sight on magnetic tape has not materialized commercially. But at least three tight-lipped companies have been reported to be working on such a TV sending system.

The tape-recording equipment probably will be connected directly to the output of the television camera's video amplifier. After the picture has been recorded, the tape will be played back on a machine that feeds the "canned" picture to another video amplifier for broadcasting.

Tape offers these advantages over movie film: It is ready for instant playback after recording, since it does not have to be developed. It can be used over and over instead of being thrown out after the telecast. Furthermore, tape costs less than movie film and requires less storage space. But video tape-recording equipment probably will come with a high price tag.

Television tape recordings would not look so very different from the tape recordings now made by thousands of Americans on their own home outfits.

The tape might be wider than the present variety, and it might run through the machine a little faster. But essentially a video tape recording would resemble an ordinary home-recorded tape of Junior playing the piano.

The big difference lies in the recording equipment needed to put the complex video signals on the tape.

Tape machines that record sound merely have to handle signals up to about 15,000 cycles per second. But video tape recorders, due to the complex technical nature of television, would have to handle everything from zero to 4,000,000 electric "pulses" a second.

By "trick" recording methods, engineers have found they can put 1,000,000 pulses on a tape one inch wide. On tapes four inches wide, they can record the 4,000,000 pulses. The catch comes in finding the proper trick recording system.

Home tape recorders merely amplify the sound picked up by the microphone. Using a tiny electromagnet, the machines deposit the sound on the tape. But the video signals

rush in to be recorded so fast that such a simple system would be swamped.

One experimental technique "samples" the picture about 300,000 times a second instead of, say, 4,000,000 times. That trick seems to offer promise.

Although tape holds many advantages over film as a recording medium for television, its future still is uncertain. Research engineers hope it will do what they think it will, but as one put it, "We won't know until we try it out."

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NUTRITION

Figure Cost of Eggs On Basis of Weight

► MOST AMERICANS like fried eggs for breakfast and hardboiled eggs for picnics. But there are hundreds of other ways of using eggs, and since they are a high quality, complete protein food, it will pay the housewife to look into some other ways of serving them.

They supply all the essentials for the building and repair of body tissues as well as valuable vitamins and minerals. They can be used in place of meat and even when eggs are high, they may be a better buy for a main course dish than meat.

When buying eggs, figure the cost on the basis of weight rather than by the dozen, advises Elizabeth E. Ellis of the University of New Hampshire. A comparison of the cost per pound of the different sizes will readily show which size eggs are lowest in price, and will enable homemakers to select the eggs which will give the most value for the money, she says. For example, if eggs are selling at 60¢ a pound, then the small eggs will be 68¢ a dozen, the medium eggs 80¢ a dozen, and the large eggs 90¢ a dozen.

Buying eggs by grade is another way of being sure you are getting the quality you are paying for.

Remember that refrigerated eggs keep their quality longer than eggs kept at room temperature. So look for the ones in the refrigerator when you go to market, and put them in your own refrigerator when you get them home.

Be careful, too, to handle the eggs gently. Jarring or jouncing breaks down their quality. Even if it does not crack or break the shell, it may cause the white of the egg to lose much of its firm, upstanding quality. So protect the delicate structure inside the egg as well as the shell when you handle it.

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NOBELIST FELIX BLOCH—Originator of a new technique of qualitative analysis by nuclear induction, Dr. Bloch of Stanford University, California, here examines part of a working model of equipment used in his research.

GENERAL SCIENCE

Science Manpower Body Urges Best Defense Use

► A SCIENTIFIC Manpower Commission to combat the "ignorance or indifference commonly displayed" in the military and in Congress as to the uses for defense of scientific and technological personnel is being set up by six of the most important scientific bodies in the nation.

The new commission, according to an announcement, will conduct a "program of public education that will inform the public and their representatives in the Congress regarding current needs, prospective or actual shortages of manpower, and such other personnel matters as may bear upon the defense situation and the national welfare."

"Widely divergent opinions" regarding the relative importance of military service as compared with scientific and technological service in the present emergency will be dealt with by the new body. The six groups sponsoring the commission are: The American Chemical Society, the American Geological Institute, the American Institute of Biological Sciences, the American Institute of Physics, the Federation of American Societies for Experimental Biology and the American Association for the Advancement of Science. The commission is expected to set up shop in about 60 days.

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PHYSICS

Nobel Physics Winners

For finding ways of learning some of the secrets locked in the nuclei of atoms by tuning in on radio frequencies, Drs. Felix Bloch and Edward M. Purcell are awarded Nobel prize.

► A WAY of tuning in by radio frequency on the heart or nucleus of the atom to determine the mysterious and strange forces within it has won for two American physicists the 1952 Nobel prize for physics. Nuclear properties of the atom are keys to future atomic progress.

Independent work along the same lines was done by Dr. Felix Bloch, Stanford University professor of physics, and Dr. Edward M. Purcell, Harvard University professor of physics (see p. 319), who share the prize worth about \$33,000.

Atomic particles spin and carry electric currents. They thus behave like small magnets. Placing these invisible magnets in an alternating magnetic field gives rise to electric forces which can be measured by short radio waves. New information about the structure of matter has been discovered by varying the electric and magnetic forces to which atomic magnets respond, and meas-

uring the time necessary for the tiny magnets to respond.

One application of the method by Dr. Purcell was the prediction of invisible hydrogen gas in the space between the stars of the Milky Way and the detection of its radiation with a radio telescope.

The phenomenon is known as nuclear induction or nuclear magnetic resonance induction. Amplified radio frequencies reproduced on an oscillograph screen show the observer what frequency the atom responds to. Each element has a characteristic frequency to which it resonates in a magnetic field under the influence of radio-frequency electric current.

Dr. Bloch was born 47 years ago in Switzerland and came to this country from Germany in 1933. Dr. Purcell is 40 and a native of Illinois with his undergraduate degree from Purdue.

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NOBELIST EDWARD M. PURCELL—For his work in helping to unravel the mysterious forces of the atom's nucleus, Dr. Purcell of Harvard University, was awarded the 1952 Nobel prize for physics.

CHEMISTRY

Nobel Chemical Awards

Two British biochemists, Drs. R. L. M. Synge and A. J. P. Martin, receive Nobel prize in chemistry for development of chromatographic separation processes.

► CHROMATOGRAPHY, THE process developed by British biochemists Dr. Richard Lawrence Millington Synge and Dr. Archer J. Porter Martin, this year's Nobelists in chemistry, is fundamentally as simple as blotting ink or mopping up spilled milk. The fibers take up the liquid, as everyone knows. Only the scientist stops to ask how this happens and where the liquid goes.

Drs. Synge and Martin adapted chromatography and extended it to produce new information about albumin and other life substances. Chromatography is a process in which colored extracts, originally of grasses and flowers, are observed to separate into two or more bands of different colors as they trickle down inside a long glass tube filled with some kind of insoluble filtering material, similar to fine sand.

In this form, the principle was used by the Russian botanist, Michael Tswett, in 1904, to learn the constitution of the green coloring matter of grass and leaves. Newer adaptations of the method are used for many colorless substances, but the name chromatography has stuck with the process.

As used by Drs. Synge and Martin, the tube of sand is replaced by the fibers of fine

filter paper. A drop of solution taken up by a strip of such paper will spread along the fibers.

Just as the green grass extract separates into different bands of greens and yellows as it trickles down the sand-packed column, the solution of albumin, in their experiments, separates as it travels along the filter paper until what started as a homogeneous mixture ends as a series of bands each composed of a pure substance.

The mixture has sorted itself out because each of the substances in it has its own rate of travel. When enough time has gone by, the zones of paper containing the separated substances may be chipped apart and the substances recovered by dissolving them in suitable liquids, or they may be tested in other ways while still on the paper. The spread-out material on the paper is called the chromatogram.

Refinements of the process consist of enclosing the apparatus so as to keep the material in an atmosphere where the concentration of solvent is high, so the solution will not dry out too quickly, and using a wide variety of solvents to keep the boundaries of the separated materials moving as the researcher wishes.



NOBELIST RICHARD L. M. SYNGE—Honored with Dr. Archer J. P. Martin for the seemingly-simple discovery that ordinary filter paper may be used for chemical analysis was Dr. Synge.

Dr. Martin, 42, is now at the National Institute for Medical Research, London, and Dr. Synge, 38, is at the Rowlett Research Institute, Scotland.

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AERONAUTICS

Intercontinental Airways

Planes flying between North America and Europe or Asia expected to take the North Pole routes. Arctic airways save both mileage and time.

► AIRPLANES OVER the Arctic, following Great Circle routes between the two hemispheres, will probably become common in the next decade or so. The new defense airport at Thule, Greenland, is geographically located to serve as a half-way refueling station. Its primary purpose may some day be to serve civilian planes rather than military aircraft.

Thule alone will not be able to serve all the probable airways of the future that will connect the hemispheres by North Pole routes. But airports are already in use or under construction in Alaska and, thanks to the hundreds of polar exploratory flights made by the U. S. Air Force, Arctic waters and Arctic conditions are no longer secret and other far-northern landing fields will probably follow.

The advantage of the Arctic routes between the hemispheres is the mileage and the time they save. Thule in northern Greenland is on Great Circle routes from much of the United States west of Chicago to much of Europe and Asia. It would serve air traffic between such points just as Gander Airport in Newfoundland is now serving transportation between eastern America and western Europe. Newfoundland is on the Great Circle from New York to the British Isles.

Thule, well north on Baffin Bay and only about 930 miles from the North Pole, has

climatic conditions which present difficulties as a fueling station, but they are not unsurmountable.

Its harbor is open to surface vessels for only about two months each year and giant storage tanks will be necessary to hold the fuel brought in by ocean tankers during those months to supply aircraft for the entire year. For military aircraft, fuel can be delivered by air when necessary. Airborne fuel would be expensive for civil transports.

The long "night" at Thule is somewhat of a disadvantage. For about four months each winter the sun does not get above the horizon. The most advanced system of approach and landing lighting is essential. A powerful omnirange to provide radio beams for pilots to follow from distant points and efficient instrument landing systems will be required.

Ground Control Approach equipment, the radar-radio device for use in overcast conditions, was one of the first installations. Heat and power for buildings and equipment in a region where the summer temperature reaches only about 40 degrees Fahrenheit is another problem. These are all surmountable difficulties and Thule may turn out to be one of the most important civilian airports located anywhere in the world.

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OCEANOGRAPHY

Ocean Part of Campus

► A NEW concept of the job of marine laboratories is working to move the campus to the ocean at Florida State University.

Students in fields ranging from astronomy to zoology are busy at work at Florida State University's bustling Oceanographic Institute. Professors of economics, meteorology, and even psychology are active members of the institute's staff.

Outwardly, the Oceanographic Institute appears to be like any other marine station. It has an excellent laboratory, boats, scientific equipment and fishing gear located on an ideal harbor in the Gulf of Mexico, 30 miles from Tallahassee. On the campus, the institute has its own offices, a regular staff of three scientists, plus a willing crew of graduate students.

The institute differs from other marine laboratories, however, in that it does not limit its activities to the usual subject matter of oceanography. Instead, the institute

is an independent body, set up to serve any department of the university that can use its many facilities.

For instance, the geology department of the university has been working with the institute to get a series of bottom samples from the Gulf of Mexico. This will help the geologists to learn about the formation of the Florida peninsula.

The economics and sociology departments are using the facilities of the institute for studies on the Florida fisheries and living conditions of the fishermen.

Even psychologists are taking advantage of the unique organization of the Oceanographic Institute. Using live mullets captured by regular staff members of the institute, the psychology department has just completed a series of experiments on the fishes' reactions to electrical and mechanical stimuli. The data will be used to design new techniques in commercial fisheries.

Dr. Harold J. Humm, a young, enthusiastic marine biologist, is the organizer and driving force behind the Oceanographic Institute. As its designer and present director, he is satisfied with the progress the institute has made, but is still looking for other ways the marine station can serve the campus.

"When every department on campus can feel that it can have the ocean at its fingertips through the work of our laboratory, then the Oceanographic Institute will have done its job," Dr. Humm said.

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DENTISTRY

One-Tenth of Population To Have Tooth Protection

► FROM NORWOOD Village, Wash., to Washington, D. C., communities are fluoridating their water as a protection against tooth decay. Latest tally reported to the American Dental Association in Chicago shows a total of 423 communities serving nearly eight million persons on the fluoridation wagon. The measure has been approved for another 305 communities serving 16 million persons.

Yearly cost averages slightly more than nine cents a person, with one-fourth of the communities operating at an annual cost of five cents per person or less.

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TECHNOLOGY

Whiter Sidewall Tires Use Paper Making Waste

► NEW AND better tire sidewalls that stay white longer are made possible by use of a waste from paper making.

John J. Keilen and Walter K. Dougherty, both of the West Virginia Pulp and Paper Co., Charleston, S. C., have reported to the American Chemical Society that tire sidewalls can be made from reclaimed rubber and coated with a thin layer of new white rubber. The sidewalls will stay white longer if protected by activated carbon made from a waste liquor of an alkaline wood-pulping process.

Reclaimed rubber has been used before in auto tire sidewalls. But processing chemicals often pass from the reclaimed rubber to the new rubber coating, causing discoloration.

Activated carbon absorbs many of these chemicals, such as oils and antioxidants. The absorption prevents the chemicals from migrating through the rubber so rapidly. That helps to keep the white rubber free of discoloring impurities for a longer time.

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ENTOMOLOGY

Insecticide Soak Keeps Bulbs Maggot-Free

► TO KEEP narcissus bulbs from becoming infected with the destructive narcissus bulb fly, soak them in insecticide solutions for short periods of time before planting.

Such treatment with aldrin, chlordane and heptachlor prevents the entrance of the larvae, or maggots, of this fly into the bulbs, scientists at the U. S. Department of Agriculture have found.

The narcissus bulb fly maggot enters the bulb while it is growing in the spring. The yellowish-white larvae, about three-fourths of an inch long, are equipped with strong hooked mouth parts and eat a tunnel into the bulb. The bulb then becomes soft and its growth is retarded.

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TYPHOON'S EYE—Taken from a B-29, 16,000 feet up, near the center, the picture shows the eye of a Pacific typhoon. The top rim towers 35,000 feet high. In the center can be seen what is believed to be a "horizontal tornado." At bottom are two squalls, thought to have been caught up in the typhoon when it was born.

METEOROLOGY

Temperature Change

► A TEMPERATURE drop of 32 degrees Fahrenheit in 60 miles was recently discovered in the center of a typhoon. This is the greatest temperature change in such a short distance ever discovered in free air and it is an indication of the terrific energy to be found in a tropical storm.

The discovery was made by Robert H. Simpson, a special assistant at the Weather Bureau and a typhoon and hurricane expert, who flew through the eye of a typhoon over the Pacific last summer. Mr. Simpson first learned of hurricanes the hard way—at the age of six his father took him on his shoulders to swim him hurriedly away from their home in Corpus Christi, Tex., during the great storm of 1919.

The temperature drop was observed as Mr. Simpson flew, in an Air Force B-29, 18,000 feet up over the direct center of the storm, to the edge of the eye 20 miles away and 40 miles beyond through the clouds. He comments that it takes a vast amount of energy to bring about such a temperature change and that the energy of a tropical storm seems to be concentrated to a great extent within 60 miles of the center of the storm. This particular storm was called "Typhoon Marge."

The B-29 flew through the eye of the

storm at levels from 800 to 18,000 feet. The eye, around which a storm revolves, is a spectacular sight. Here is the way Mr. Simpson saw it:

"Marge's eye was a vast coliseum of clouds, 40 miles in diameter, whose walls rose like galleries in a great opera house to a height of approximately 35,000 feet where the upper rim of the clouds was smoothly rounded off against a background of deep blue sky."

The sea surface at the bottom of this bowl was obscured by clouds, in which there were two circular openings.

These appeared to be squalls, little storms which might have been caught up in the great whirl of the typhoon when it was first born. The squalls appeared to circle around the center of the eye. Mr. Simpson speculates that the force of these little squalls, as they circle, might account for the wobble noticed in the paths hurricanes and typhoons take as they traverse the oceans.

Mr. Simpson believes that two B-29's should be in the eye of a hurricane or typhoon at once in order to bombard it with observations. He is hoping this will happen one day and thinks it would produce much new knowledge about these storms.

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METEOROLOGY

Jets Survey Jet Streams

Two jet planes, operating as a team, have started the first survey of the fast-flowing air currents found about 30,000 feet up, known as the jet streams.

► JET PLANES, for the first time, this week started tracking jet streams, the 200- to 300-mile-an-hour air currents found about 30,000 feet above the earth. Better weather forecasts and faster long-range airplane flights are expected to result from this first direct survey of air movement high above the earth's surface.

Covering six or seven hundred miles each flight, the jet planes, based at Patuxent River, Md., will chart the westerly flowing air rivers over both land and ocean. Data gathered by the two planes, operating as a team, will be recorded on film and analyzed by meteorologists at the University of Chicago.

"Precipitation sits on the nose" of the jet stream, Dr. Herbert Riehl, meteorologist at the University, explained. Generally, the ground air is moist if the jet stream is coming toward us, dry after it has passed high overhead, he said.

Jet streams were first found during World War II when high-flying B-29's making bombing runs on Japan were left almost literally hanging in mid-air trying to fly against the fast-flowing air currents. Two main streams are known, both covering the middle latitudes, one in the northern hemisphere, one in the southern. They twist and turn, meandering in much the same way as brooks, rivers or the Gulf Stream wanders, occasionally looping back on themselves.

Storms are formed where the jet streams meander, meteorologists believe. These storms are related to those that rage on the surface. The formation of clouds, the amount of rain, snow and other precipitation, and the movements of warm and cold fronts are controlled by upper air currents.

From the jet-plane study, weather forecasters will get data on such things as the changes in temperature at different points and levels in the jet stream, the amount of turbulence and the formation of ice crystals. Using such information, Dr. Riehl and his co-workers will make ground weather predictions, then compare their forecasts with the actual weather.

If their predictions hold, jet stream records will give meteorologists a new and important tool for ground weather forecasting.

The study, under a grant from the Navy's Bureau of Aeronautics, is known as AROWA, for Applied Research Operational Weather Analysis. It is an example of the recent trend towards "bridging the gap" between the meteorologists, who are figuring out theories as to how and why the weather, with the forecasters who do the

daily, five-day and 30-day prediction, in order to give the latter group a chance to take full advantage of the latest theories.

Another example of this trend are the Air Force, Navy and Weather Bureau forecasters taking special courses in theoretical and practical meteorology at the University.

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ELECTRONICS

Television in Autos Not Practical Idea

► ALTHOUGH 25,000,000 American automobiles are now claimed to be equipped with radio receivers for the information and amusement of motorists, few will be equipped with television sets in the near future. The reason is both legal and technical.

Legislation has already been enacted in many states prohibiting television receivers in motor vehicles in a position where they can be seen by the driver. This does not prevent their installation for passengers on the rear seat. But they require many times the amount of electric power used for radio

receivers. This means that a car will need a heavy duty generator.

In a car traveling the highways, television reception would probably be unsatisfactory. Television is much more sensitive to outside interference than radio. The constantly changing distance from the broadcasting station means reception would be unreliable. With "back-seat" television, "viewing" distance between the television screen and the passengers is much shorter than usually regarded as desirable.

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ASTRONOMY

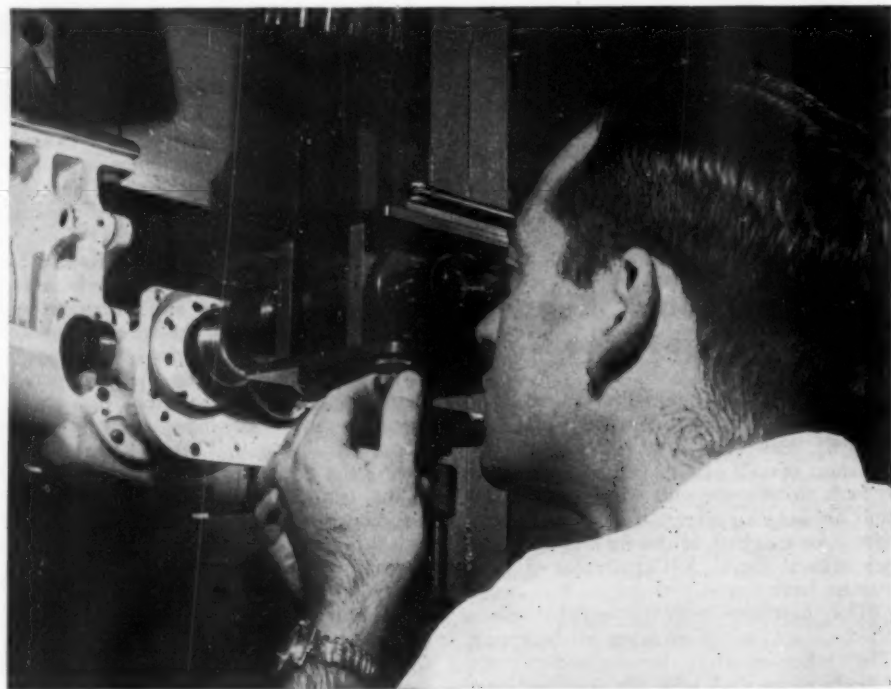
Vast Bridges of Stars Connect Distant Galaxies

► BRIDGES OF stars, some more than 10,000 million million miles long, have been found to connect gigantic groups of stars such as the Milky Way galaxy to which our sun belongs.

Many of these stellar highways have been spotted by Dr. Fritz Zwicky, professor of astrophysics at the California Institute of Technology, Pasadena. The chains of stars show up when great contrast is used in developing plates taken with the 48-inch Schmidt telescope on Mount Palomar.

"Once the observer knows what to look for, it is easy for the discerning eye to pick up thousands of similar cases," Dr. Zwicky states in the *Publications of the Astronomical Society of the Pacific* (Oct.). The most important of the systems so far spotted are now being photographed with the 200-inch Hale telescope.

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FINAL CHECK—Rigid tests given to optical range finders insure that the slightest imperfection will be detected before they are crated and sent to the Detroit Arsenal for installation in the new M-47 tanks.



LOOKING FOR HEART TROUBLE—Blood samples from 550 cadets are analyzed on this impromptu production line supervised by Lt. Col. Lawrence J. Milch (in background) of the Air Force School of Aviation Medicine, Randolph Field, Tex. He is looking for a tendency to early heart disease in seemingly sound cadets.

PHYSIOLOGY

Heart Disease Tendency

Air Force scientist seeks blood tests to show, long before the first attack, which apparently healthy men and women may be vulnerable to heart disease.

► **PREDICTION** OF a tendency to heart disease in healthy young men and women long before the first attack is the aim of a long range study started by Lt. Col. Lawrence J. Milch of the U. S. Air Force School of Aviation Medicine at Randolph Field, Tex.

Prevention of disastrous plane crashes that can occur if the pilot's heart stops while he is at the controls is the prime reason the Air Force has undertaken the study. But non-flying men and women will certainly benefit if Col. Milch achieves his goal of finding tests to detect a tendency to heart disease.

Present physical examinations of pilots, though rigorous and frequent, do not detect such a tendency.

Samples of blood from 550 cadets of the incoming class at the U. S. Military Academy at West Point, N. Y., are now being examined at the Randolph Field Laboratories. These young men were all screened for health before entering the Academy and for the next four years will live under the same conditions, eat the same diet and be subjected to the same physical and mental strains. The blood tests will be repeated

at the end of the cadets' second year and again just before they receive their commissions. The men will be followed throughout their military careers for a further check on the value of the tests.

On the West Point blood samples Col. Milch is using just two tests. They are to determine the relative efficacy of total blood serum cholesterol, and of the concentration and distribution of different blood serum fatty proteins in the ultra-centrifuge with regard to their ability to cause a kind of fatty degeneration of the arteries.

The overall project includes two other tests: 1. The ratio of phospholipids to cholesterol in blood serum, and 2. The concentration of blood serum fatty proteins determined electrophoretically.

Disturbances in the relative amounts of cholesterol, fatty proteins and phospholipids have been implicated as playing a part in causing artery degeneration and through that in heart disease. If so, picking up such changes very early may be the means of detecting and, perhaps by diet, preventing further development of a tendency to heart disease.

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BIOCHEMISTRY

Vitamin Lack Linked To Artery Hardening

► **VITAMIN LACK** and protein may have more to do with hardening of the arteries than faulty fat utilization.

Vitamin B-6, or pyridoxine, is the one that may be needed to keep arteries healthy.

This view, reversing some present ideas, comes from Drs. James Rinehart and Henry D. Moon, pathologists in the University of California School of Medicine, San Francisco.

They find that hardening of the arteries starts with deposits of mucus-like material in the lining of the blood vessel walls, rather than with deposits of the fatty chemical, cholesterol. Cholesterol and other fatty chemicals are laid down in the mucoid formations.

The mucoid deposition is progressive with age but is not necessarily a normal process. Finding that hardening of the arteries, or arteriosclerosis, begins with mucoid deposits suggests that the disease is more closely related to the body's handling of protein than to its handling of fat.

Because this picture of human arteriosclerosis closely parallels that produced in monkeys by a diet deficient in vitamin B-6, Dr. Rinehart believes B-6 lack is worth considering as a cause of the disease in humans.

The new view of artery hardening is based on studies of the arteries of 250 persons, some of whom had died of coronary thrombosis. New staining techniques helped the scientists differentiate substances found in the artery walls. The studies are reported in *Circulation* (Oct.).

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PHYSIOLOGY

How A-Bomb Particles Penetrate Human Skin

► **WHEN AN A-bomb** explodes, does its tremendous force hurl minute particles of dust and other matter through the air with such force that they penetrate the skin of persons in the immediate vicinity?

This is the subject of research being done by Dr. Benedict Cassen and Brian Dunne at the University of California's Atomic Energy Project.

"If such particles are radioactive, they could be hazardous upon penetration of the skin," Dr. Cassen points out. "One objective of our research is to determine under what conditions penetration might occur."

A "needle-less" hypodermic syringe that "shoots" solution through the skin by the use of a supersonic jet device is being used in the initial phase of the study. This phase is concerned with the behavior of the jet.

The jet stream is observed by means of a spark shadowgraph. This instrument generates a flash so brilliant that the detailed shadow of structural features of the stream can easily be recorded in less than one-millionth of a second.

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TECHNOLOGY

Skidding Machine Helps Develop Non-Slip Tires

► CHEMISTS HOPE to develop better non-skid automobile tires with the help of a skidding machine.

Dr. C. S. Wilkinson, Jr., chemist at Good-year Tire and Rubber Co., Akron, Ohio, has devised an apparatus that consists of a circular aluminum ice tray that turns under rubber test blocks. Highly sensitive measurements yield the amount of friction between the rubber and ice.

The laboratory machine gets around drawbacks of outdoor test sites where many conditions are subject to sudden change. The temperature may go up, the ice surface may deteriorate under the test skids and even the driver's ability may vary from test to test. The machine, however, permits these factors to be controlled or eliminated.

By using the device scientists have found that temperature has the greatest influence on tire friction on ice. At the lowest test temperatures, from about minus 22 to minus 40 degrees Fahrenheit, the coefficient of friction is about twice its value at a temperature just below freezing.

The kind of rubber and its hardness also affect friction. In similar compounds, the softer samples had higher coefficients of friction, Dr. Wilkinson has reported to the American Chemical Society.

Science News Letter, November 15, 1952

NUTRITION

Vitamin C a Must In the Daily Diet

► VITAMIN C is a must on the daily diet. This is because the body cannot store much of it. Vitamin C is known also as ascorbic acid. It is the anti-scurvy vitamin and is essential for keeping body tissues in good condition.

Many persons rely on the breakfast fruit juice for their vitamin C ration. If you do this, check your choice because some fruit juices supply more than others. Orange juice and other citrus juices, fresh, frozen and canned, rank high in content of this vitamin.

Tomato juice is another good source of vitamin C, though, unless fortified with added vitamin C, it takes more than twice as much canned tomato juice to match canned orange juice. Pineapple juice has much less of this vitamin, and only traces—unless the juice is fortified—are to be found in apple, prune, or grape juice, all popular for flavor and variety.

Extra vitamin C is sometimes added to apple juice and other canned, bottled and frozen juices which are short on it. The fortified juices may have as much or more vitamin C as citrus, the nutritionists explain, but be sure to check the label to see if the vitamin has been added.

If your breakfast juice is short on C, be sure to get this vitamin in some other dish

or later in the day. Among other vitamin-C-rich dishes are the fruit itself of citrus and tomatoes which can be served many ways in any meal. Excellent sources of ascorbic acid are strawberries, kale, turnip greens, broccoli, raw cabbage, green peppers, and the dark-colored raw salad greens. Good providers are lightly cooked cabbage or collards, cantaloup, sweetpotatoes, cauliflower and spinach.

Science News Letter, November 15, 1952

BACTERIOLOGY

Washed Cherries Keep Better Than Unwashed

► CONTRARY TO the old idea, washed cherries will resist decay much better than unwashed fruit, University of California scientists have discovered.

It is a popular notion among fruit growers that fruit keeps better if it is not washed. But when a grower recently reported that he got less decay from cherries washed in water, C. E. Yarwood and H. T. Harvey of the department of pathology of the university set out to find the facts.

The scientists selected a number of freshly picked cherries, Lamberts and Royal Anns, washed part of them in plain water, part in a mild detergent solution, and left the rest as they came off the tree. Then all the cherries were put aside for a week.

At the week's end, only 29% of the unwashed Lambert cherries were not spoiled, while 43% of the water-washed and 55% of the detergent-washed fruits remained sound. In one test with the Royal Ann cherries, only 19% of the unwashed fruit was all right, while 83% of those washed with water and detergent was unspoiled.

Science News Letter, November 15, 1952

ENTOMOLOGY

Hitch-Hiking Insects Cross Desert Barriers

► INSECT PESTS have crashed the natural barriers of lifeless deserts by hopping rides on man-made transport, Prof. P. E. L. Vayssiere of the Paris Museum of Natural History told an international body of desert scientists in London.

In a natural state, most undesirable insects are unable to spread across barren desert areas, he said, and their destructive powers are held in check. But with the increase of caravan travel across the deserts, insects have been accidentally carried along and spread to parts of the world where their natural enemies are few and plants have not developed resistance to them.

The process has been speeded up with the coming of highways, railroads and airplane routes across the deserts, and now the spread of these hitch-hiking pests has become a major problem. Prof. Vayssiere said there is serious danger of such newly introduced insect pests becoming menaces in areas where they were completely absent before.

Science News Letter, November 15, 1952

IN SCIENCE

ASTRONOMY

Many Bright Stars Born Since Life on Earth Began

► MANY OF the brightest stars in the heavens have been created since life began here on earth, Dr. Cecilia Payne-Gaposchkin of Harvard University has reported.

White dwarf stars are stellar bankrupts, having already lived out their lives. Other stars have been born since life came into being here on earth. Still others are yet to be born.

The birth of a star might take a million years, Dr. Payne-Gaposchkin states. Enough atomic clouds, the stuff from which stars are made, are still floating within our galaxy for a thousand million stars to be created out of the matter they contain.

The life expectancy of the sun is estimated at 5,000 million years. The probable life spans of many of the best-known stars also are presented in "Stars in the Making," published by the Harvard University Press. (See SNL, Nov. 8, p. 300.)

Science News Letter, November 15, 1952

ENGINEERING

Vast Projects Reclaim Desert in Soviet Russia

► VAST PROJECTS for the reclaiming of desert land in the USSR were described at an Institute of Biology symposium on deserts in London by Dr. Sidnie Manton, London University zoologist. Dr. Manton said she is still puzzled as to why she was invited to accompany a party of five other scientists behind the Iron Curtain since she is "not a member of any group associated with the Soviet Union in any way."

"I have seen the desert blooming like a rose," Dr. Manton told the group of desert experts, describing some of the Soviet's grandiose plans that were told to her.

A hydroelectric scheme, begun in 1950, will convert 2,400 miles of the Volga River into a series of lakes to serve an area as large as Scotland, and a 650-mile canal from the Amu Darya River to the Caspian Sea will water the arid Turkmenistan plain, the Russians told her.

The Turkmenistan plain covers an area of 20 million acres, 3,000,000 of which will be watered for crops, the rest to be flooded for pastures, she said. Three hundred scientists are already working on the scheme, Dr. Manton was told, with another 200 to be added later.

According to Dr. Manton, the Soviets say that, by 1956, 2,000,000 gallons of water which now run into the Arctic annually will be diverted south and west to irrigate Central Asia.

Science News Letter, November 15, 1952

SCIENCE FIELDS

VETERINARY MEDICINE

Sheep Disease Outbreak Has One-Year Incubation

► WOOL AND lamb chops from California sheep are threatened by an outbreak of the sheep disease, "scrapie," appearing for the first time in U. S. flocks.

Outbreak of the fatal virus disease is dangerous because its incubation period is a year. Symptoms then include first a violent trembling of the ears, lips and limbs, followed by a serious itchiness that causes the sheep to scratch constantly. The name of the disease, scrapie, is thought to be based on this scratching. Over three or four months, the animals lose weight, become extremely emaciated and die.

U. S. Department of Agriculture scientists do not know how the disease was introduced into this country, and to prevent its further spread, California sheep have been quarantined. It is expected that the flocks in which the infected sheep were found will be slaughtered and buried.

A California veterinarian has suggested that the disease might be spread at breeding time. The virus has been transmitted experimentally by injecting an infusion of scrapie-diseased brain tissue into healthy sheep.

The disease is known to occur in Canada, Australia and northern Scotland, where it is eradicated by slaughter.

Science News Letter, November 15, 1952

AERONAUTICS

Belly for Airplane Becomes Highway Trailer

► A HIGHWAY cargo trailer body that is easily attached to become the belly of a special airplane is one of the newest developments to provide fast and convenient handling of freight from factory to destination. This "flying trailer" was developed by Fairchild Engine and Airplane Corporation, Hagerstown, Md., and is about ready for extensive service.

On the highway its rectangular body resembles an ordinary trailer as it is towed along on its own wheels behind a truck, tractor or car. In the air, however, it looks more like the under-body compartment of a cargo plane because its front and rear end doors can be opened and locked in a "V" shape to cut air resistance aloft. The same doors fold over each other to give a flat front and rear when traveling the roadway.

The airplane to carry this cargo trailer is the Fairchild XC-120 Pack plane. It is a plane without space in its fuselage to carry cargo, but designed for use with a detachable cargo compartment of boxcar size. The body of the plane, with its extended land-

ing gear, can straddle the giant "capsule" it is designed to carry. The trailer is a new type of capsule.

Wheel assemblies, which include shock-absorbers and truck-type wheels and tires, are removed prior to flight and stowed aboard the flying trailer. On landing they are easily attached. Wide use of the trailer is expected because it can be loaded at the factory, towed to the airport, carried to a distant flying field, then towed again to its final destination.

Science News Letter, November 15, 1952

ENGINEERING

Scientists Build Asparagus Cutter

► A MECHANICAL harvester for green asparagus that may save farmers about \$80 per acre in labor costs annually has been built by agricultural engineering scientists at the University of California's College of Agriculture.

Under the direction of Robert A. Kepner, associate professor of agricultural engineering, experiments indicated that such a mechanical harvester is feasible—mechanically and economically.

The harvester, which is mounted on the rear of a tractor, grips the asparagus spears, cuts them with a band saw, and deposits them in a hopper. The test model was designed to cover a bed only 15 inches wide, but can be readily expanded for the normal bed width of 30 to 36 inches.

The machine, which travels at about two and one-half miles per hour, cuts all asparagus spears, regardless of length; it recovers about 90% of all spears longer than four inches.

Mr. Kepner estimates that one full-sized machine, operated 10 hours per day, could take care of 80 acres of asparagus on a five-day cutting schedule. The machine would require a driver and one man to box the asparagus, but would replace 10 to 12 hand cutters.

Science News Letter, November 15, 1952

VETERINARY MEDICINE

Spinal Discs Give Dogs Backaches Also

► DOGS AS well as their masters can have backache and difficulty in walking because of protruded discs in the spine.

The pain is intense, because of pressure on a nerve root. The protruding disc may be in the region of the neck or farther down the back.

Success with an operation for removal of the disc nucleus in afflicted dogs is reported by Drs. Sten-Erik Olsson and Hans-Jorgen Hansen of the Royal Veterinary College at Stockholm, Sweden, in the *Journal of the American Veterinary Medical Association* (Nov.). After the operation, the pain was gone and the dogs were able to walk normally. Six months later their owners reported them still in good health.

Science News Letter, November 15, 1952

MEDICINE

Aspirin Promotes Deep Breathing, Oxygen Use

► ASPIRIN MAKES a person breathe more deeply and use more oxygen. The "marked and progressive" increase in oxygen consumption is probably responsible for the drug's action as a remedy.

The new finding on aspirin's effect is announced by Dr. J. B. Cochran of the University of Glasgow, Scotland, in a report to the *British Medical Journal* (Nov. 1).

Five healthy young men who volunteered for the study and four patients, one with rheumatoid arthritis and three with sub-acute rheumatism, were tested. Some swallowed aspirin and some got the drug in the form of a salicylate injection into the veins.

Those who swallowed the aspirin consumed up to 30% to 40% more oxygen, and those who got it by vein consumed up to 60% to 70% more than they did without aspirin.

This increased oxygen consumption must, Dr. Cochran points out, be due to a speeding of the rate at which the body is burning fuel. Probably it is protein or fat or both, rather than sugars and starches, that is being predominantly combusted.

Science News Letter, November 15, 1952

GENETICS

Identical Twins Alike in Old Age as When Young

► IDENTICAL, or one-egg, twins are as much alike when they grow old as they were in childhood when even their parents had difficulty telling them apart.

This likeness, which stays with them throughout life, shows in both physical and mental qualities. Environment has little effect on it.

Studies of more than 2,000 twin pairs over 60 years old show this, Dr. Franz Joseph Kallmann of the New York State Psychiatric Institute and Columbia University reported to the New York Academy of Medicine.

To understand fully the basic principles of mental and physical health one must, Dr. Kallmann said, "delve into the substratum of gene action as well as into the subconscious."

"The habit of disputing the effect of heredity in man," he stated, "is apparently as satisfactory a method as any of sublimating hidden family resentments provoked by one's station in life."

Genetic problems are so complex, he said, that it is fortunate most of them can be studied "within a pure line" by means of the twin study method.

Although the identical twins, from one fertilized egg, remain identical throughout life, two-egg pairs of twins show a wide range of variability in the physical signs of aging. This is true even when members of the two-egg pairs always lived in a comparable environment.

Science News Letter, November 15, 1952

ANTHROPOLOGY

Man's Great-Great-Grandad

Over a million years ago in the caves of South Africa lived the forerunner of modern man. He made his dinner on the brains and meat of animals long extinct.

See Front Cover

By MARJORIE VAN DE WATER

► MAN'S EARLIEST ancestor lived in a limestone cave in the eastern part of South Africa a million or more years ago. Not wholly human, he was nevertheless not ape enough to have fathered the long line of great apes resulting in our modern baboon, chimpanzee and gorilla.

It is the opinion of eminent anthropologists that the South African pre-man was that "missing link," a half-way step between the common ancestor of both ape and man and the first human himself. Other claimants to the position of man's greatest great-grandfather—Neanderthal Man and Pilt-down Man—are now deemed only uncles.

Although the South African pre-man did not have the big brain characteristic of modern man, his bones show that he walked nearly erect, his teeth were manlike, and his head was balanced on his spine for upright posture. There is evidence that he had intelligence enough to capture fleet young antelopes and spring-hares for food, he had hands skillful enough to wield a bone or stone club to fell his baboon prey, and he had the knowledge to join with others of his kind in the hunt and to use fire to warm him and to cook his dinner.

The skulls found imbedded in the limestone rock of those South African caves show that the crime of murder is older than man himself. Even before man first walked this earth, his forerunner had started the practice of killing his own kind. He did this by bashing in his enemy's skull with the well-known "blunt instrument."

Shows Evolution Site

The part of Africa in which this important pre-man was found consists of a bed of extremely old rock covered with a flat layer of sand and silt, glacial debris and lava. The youngest of this "young" top covering has been in place for many millions of years—long enough to carry in its slowly building and eroding rocks a history of evolution since the time before animals had backbones.

In places, the top layer has been stripped away, leaving exposed the older beds of limestone. In spots, the limestone itself has dissolved, leaving caverns where man and beast might take shelter. It was in such caves that man's early ancestor lived and died.

At Taungs, in the southwest corner of the Transvaal, there is a deposit of nearly

pure sparkling white lime, laid down by a stream of water running through an escarpment of marble-like dolomite. The lime deposit has been worked commercially since the first World War.

One of the quarry men, who had been warned to be on the lookout for interesting fossil skulls, was blasting when he came across the fossil skull of a child. The face was nearly perfect with most of the lower jaw and all the teeth. The six-year molars were just cut through and beginning to function.

Long-Sought "Missing Link"

So human did the little face look that the quarry man thought it must be a Bushman. He sent it right away to Prof. R. A. Dart at the University of Witwatersrand who immediately notified the world of science of the great find. He called the little creature *Australopithecus*, or southern ape. The first reaction of anthropologists was that the news was too good to be true—that this could not be the long-sought "missing link" in the evolutionary chain of man's development from more primitive forms.

Early skepticism was due partly to the fact that only one skull had been found and that not of an adult. Now, however, remains of more than 30 individuals of the African pre-men have been discovered, including infants, children and adults. All are ape-like in having small brains and large jaws. All are man-like in the way the head sets on the spine, indicating upright posture, and in the shape and position of the pelvic bone, showing also that these individuals walked like a man.

A cast of this skull, now at the Smithsonian Institution in Washington in the case of Dr. M. T. Newman, is shown (right), pictured with a skull of a modern child, on the cover of this week's SCIENCE NEWS LETTER.

Human-Like Teeth

But, most important, their teeth are human. An ape does not chew as you do. His jaw is hinged differently. When a man is grinding his food between his molars, his lower jaw works in a rotary motion inwardly on the side on which he is chewing. This wears off the crown of the teeth in a slope upward and toward the inside. An ape chews straight up and down; his teeth are not worn flat as are primitive man's.

Child though he was, the little Taungs baby's milk teeth already showed signs of wear in the typical human pattern.

At least some authorities on man's origin are now convinced that "Dart's Baby," as the Taungs skull came to be known, was really man's ancestor, a true "missing link," or close to it.

That is the position taken by Prof. Wilfrid E. Le Gros Clark, British anthropologist and authority on early man.

Because the remains of the African pre-men were found in caves and not laid down in layers of rock, it has not been possible to assign an exact date to the time they walked this earth. But it is believed that they are very much older than the Java Ape Man, Peking Man or other known remote forebears of man.

Food Clue to Dating

Clue to the date is given by the other bones found with them in the ancient caves. Presumably left from the dinner of the pre-men, these bones are from animals which are now extinct. Not only are the species of animals extinct, but about half the genera to which they belonged are gone from this earth. This makes scientists think that the little Taungs child lived in his cave at least a million years ago, possibly as much as two million.

The food of the Taungs pre-man also provides mute evidence of the intelligence attained by him. Apparently he liked to eat young antelope. But the antelope, then as now, was swift of foot. Man's ancestor would not have been able to run him down on foot. He must have been smart enough to lie in wait for his prey or to get together with others to surround the antelope at a water-hole.

Knew Use of Weapons

Australopithecus also had a taste for a certain giant mole. But he could not have dug this burrowing animal out from his underground tunnel unless he was able to use some kind of digging stick or stone.

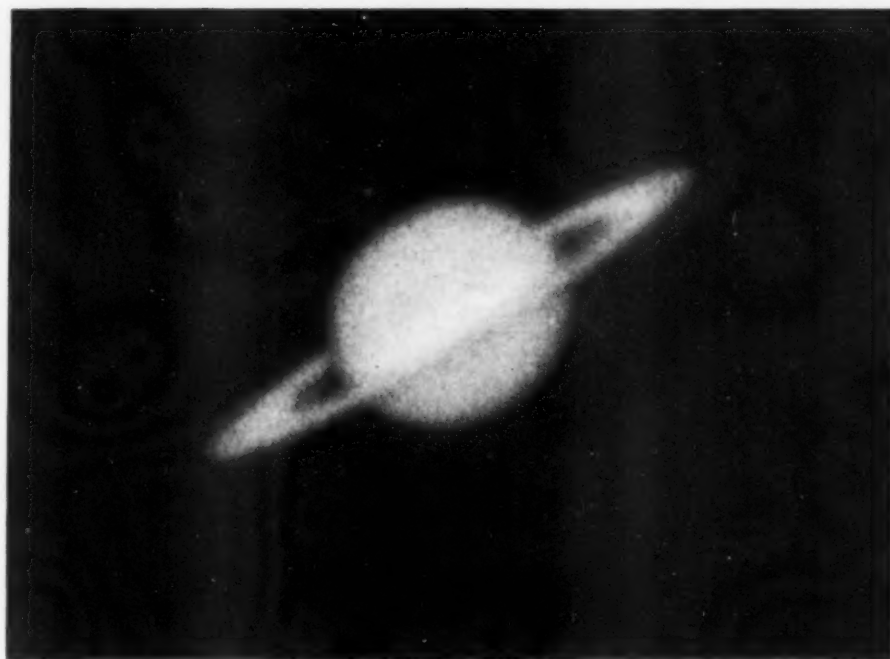
Man's ancestor seemed to regard as a special delicacy the brains of baboons. At least by far the greater part of the baboons whose bones were found in the Taungs cave had apparently had their skulls crushed in by a club or small hammer.

So before man lived in the world, his forerunners knew how to make use of simple tools and weapons and knew how to get together with others of his kind in a cooperative undertaking.

Science News Letter, November 15, 1952

Gasoline costs the equivalent of 70 to 80 cents a gallon in Europe.

To counteract heat generated by air friction, the Navy's highest-flying airplane, the D558-2 Skyrocket, must carry enough refrigeration equipment to cool a large theater.



SATURN'S CREPE RING—This picture of Saturn is notable since it shows the crepe ring, a photographic rarity. The picture was made with a ten-inch apochromatic telescope at the private observatory of Henry C. Gibson, Palm Beach, Fla. The faint, semi-transparent ring within the two bright rings is known as the crepe ring.

AERONAUTICS

Fix Safety Belts to Floor

► SAFETY BELTS for passengers in airplanes should by-pass the seats and be fastened to the floor, it is indicated in a report of a study of a crashed plane made by staff members of Cornell Medical College, New York.

The study was made of an airliner carrying 33 passengers that crashed in the water close to La Guardia Airport, Long Island. All passengers had donned safety belts. None were seriously injured but practically all the seats to which the belts were attached were loosened, broken or deformed by the strain to which they were subjected.

The plane was approaching the landing

field at a normal rate of about 135 miles an hour when one wheel of the landing gear struck the water, causing a skid, the loss of a wing and an engine. Also damaged was the bottom center of the hull, causing distortion of the lateral floor beams. The longitudinal floor beams, to which the seats were attached, were only slightly distorted. Cockpit and cabin remained otherwise substantially intact.

Within the plane, 16 of the 20 two-passenger seats were damaged, presumably by the strain on them by the belts when the wearers were thrown forward by the impact of the crash. Six seat-backs were deformed, and failures occurred in the anchorages of 10 seats. One seat was torn completely free. The principal damage to seats, in addition to anchorage failure, were breaks or bends in their metal framework, including tubes in the seat backs.

The report emphasizes the need of properly designed seats that will withstand reasonable crash conditions. Safety belts can be attached to the hull, by-passing the seats, by cable or wire. The connecting link could be arranged to absorb considerable energy before the belts are loaded to their ultimate strength.

Science News Letter, November 15, 1952

Scientists are using radioactive materials to trace the milk-forming processes of cows in hopes of increasing milk production.

GEOLOGY

Electric Current May Free Underground Oil

► BY CAUSING electric currents to surge through existing oil wells, engineers hope to raise the rate of oil flow.

Prof. C. Malcolm Davis, Pennsylvania State College petroleum expert, told a conference on petroleum production that electric power might crack the underground rock formations, allowing the oil to drain more easily from the rock. It also might generate so much heat that oil flow would be raised.

Prof. Davis said his research indicates that electrodes might be buried at the oil deposit depth and about 100 feet apart. They might be put in existing wells.

Science News Letter, November 15, 1952

NUTRITION

Expectant Mothers Need Enough Vitamins for Two

► EXPECTANT MOTHERS must consume enough vitamin C for two, Prof. Charles G. King, Columbia University chemist, has concluded.

In an experiment using radioactive glucose, a sugar which is the raw material of vitamin C, Prof. King found that embryonic guinea pigs do not manufacture the vitamin in their bodies, but are dependent on the mother for it.

Guinea pigs and humans are the only known mammals that do not synthesize their own vitamin C. They must depend on foods like citrus fruits and leafy vegetables for their supply.

It was long thought, however, that young guinea pigs and humans could make their own supply. Prof. King believes his findings definitely disprove this theory.

"Having discovered that young animals get all their vitamin C from the mother," he said, "we know the mother's intake must be enough to keep both parent and offspring healthy."

Science News Letter, November 15, 1952

ZOOLOGY

Planned Parenthood No Elephant Problem

► GIANT AFRICAN elephants never have to face the problems of "planned parenthood." Nature takes care of that matter for them.

Because of the action of certain hormones produced during and after pregnancy, female elephants cannot bear young again until 42 to 48 months after giving birth, reported J. S. Perry, British biologist, to the Royal Society in London.

The period of gestation in the African elephant is from 18 to 22 months. Both sexes reach maturity at eight to 12 years of age, the scientist said, and can breed until a very advanced age.

Science News Letter, November 15, 1952

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GENERAL SCIENCE

Science Problems Ahead

President-elect Eisenhower's term will probably be the most scientific yet. Issues range from country's health to manpower to artificial satellites.

► **PRESIDENT-ELECT EISENHOWER** faces grave decisions in what promises to be the most scientific of Presidential terms.

He will authorize the spending of eight billion dollars in four years for research by governmental agencies—Defense, Agriculture, Interior, Commerce, Public Health. Billions more will be spent on atomic energy and billions more on developing and producing weapons based on research.

He will face, and have to deal with, an ever-increasing shortage of scientific, technical and medical manpower. He will have to decide whether we shall continue to let young men go to college, thus keeping our supply of well-trained manpower replenished, or whether they are all needed in the Armed Forces immediately after leaving high school.

On his desk, perhaps even before he takes the oath of office on Jan. 20, will be a report on the explosion of the first H-bomb at Eniwetok. He will have to assess this report, then decide whether more H-bombs are to be produced or whether we stick to

A-bombs. He will have to decide how much of the Atomic Energy Commission's efforts can be directed to peaceful uses of the atom's power in medicine and for industrial power.

Sometime next year he will receive from the National Science Foundation a balance sheet on the nation's scientific effort. He will have to decide whether that effort is in balance, whether the government should support more fundamental research, whether some scientific fields are being neglected while, proportionately, too much is being spent on others.

Soon President Truman's Commission on the Nation's Health will report. The President-elect is not in favor of compulsory health insurance; neither, it is believed, will the commission favor such a program. Yet the report will recommend steps which the federal government can take to improve the quality and quantity of medical care available to all the people.

He will have before him, left over from President Truman's terms, the unacted-on recommendations of the Hoover Commission on consolidation of the government's medical services and hospitals. He will have to deal with shortages of doctors and nurses, especially nurses.

He will lead one of the world's healthiest nations, and a nation whose health is improving all the time. His problem will be to provide the leadership which will keep us healthy and improve on our good health. One field in which we shall probably go forward in the next four years is environmental sanitation—the problem of pollution of our air and our streams.

The water we drink and which irrigates and sometimes floods our fields, will receive even more federal attention. Ways to make sea water fresh on an economical basis, now being investigated by the Interior Department, may ease the threat of shortages on the West Coast. A more intensive engineering effort may ease the flood threat on the great plains.

The President-elect may have to decide whether to recommend the spending of ten billion dollars on the establishment of an earth satellite. Not only the problems of this world but of other worlds may face him.

Science News Letter, November 15, 1952

About 60% of the *milk* consumed by the world's population is produced by goats, one scientist estimates.

It costs a typical Boston family \$1,000 to \$1,700 to operate a new car 15,000 miles in a year, a survey reveals.

Do You Know?

Uncapped, abandoned artesian wells make excellent breeding grounds for cattle liver flukes.

The first pencil was devised in 1662 when a Nuremberg cabinetmaker incased thin graphite strips in wooden tubes.

Poor quality sunglasses can damage eyesight by distorting vision and by failing to shut out ultraviolet and infrared light rays.

Early removal of crop left-overs from the land may spell "death by starvation" for some insects.

Leather can be made from the skins of fish, and from every type of animal from goats to frogs.

No antibiotic or chemical agent so far discovered has been found effective against viruses of polio, flu, measles, mumps, and many diseases of livestock.

BIOCHEMISTRY

Poland Reports New Anti-TB Chemicals

► **FROM BEHIND** the Iron Curtain comes news of some new anti-tuberculosis chemicals. Named T 40, T 95 and T 139, they are newly prepared hydroxamic acids.

In nine cases of tuberculous meningitis, in which streptomycin had not been effective, adding T 40 to the treatment "produced a considerable improvement," Drs. T. Urbanski, S. Hornung, S. Slopek and J. Venulet of the Institute of Technology and the Institute of Tuberculosis in Warsaw and the Medical Academy, Cracow, Poland, report in *Nature* (Nov. 1).

Of 20 patients showing tuberculosis of the lungs in X-ray pictures, nine showed pronounced improvement of the X-ray picture, eight showed no improvement, and three became worse when treated with T 40. Some of the patients resistant to T 40 were treated with streptomycin but no improvement followed.

Science News Letter, November 15, 1952

ENGINEERING

Chart Shows Position Of Airplane in Flight

► A DOT of light on a wall chart in the airliner cabin will provide a constant answer to the passenger question, "Where are we now?" The necessary equipment is not yet perfected but it is under development by a British radio company and it is similar to a successful pilot's aid now in use.

The traveling dot of light on the chart is controlled from an automatic Decca Navigator mounted in the pilot's flight deck. This master unit is an automatic airborne version of the equipment already used at sea by hundreds of vessels. It picks up the same radio signals from ground stations that are picked up by the vessels.

The pilot's Navigator contains a strip map that moves on rollers. A stylus pen in front of the pilot follows the moving map and shows the pilot his geographical position. The same pick-up device will actuate the moving dot of light in the passenger cabin.

Use of the Navigator is growing as more and more ground stations are put into operation. Chains are now working in Britain, Scandinavia and Germany, and are being constructed in France and other parts of Europe. The pilot's master unit has already been adopted by British European Airways for its fleet and by next year will be widely used in flights over Europe.

Science News Letter, November 15, 1952

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. books in print, send a remittance to cover retail price (postage will be paid in U. S.) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AMERICAN EDUCATION AND RELIGION: The Problem of Religion in the Schools—F. Ernest Johnson, Ed.—*Institute for Religious and Social Studies (Harper)*, 211 p., \$2.00. A series of lectures given at the Institute for Religious and Social Studies of the Jewish Theological Seminary of America.

ANNUAL REPORT 1951 NATIONAL BUREAU OF STANDARDS—A. V. Astin, Director—*Govt. Printing Office*, U. S. Dept. of Commerce Misc. Publication 204, 105 p., illus., paper, 50 cents. Research of the past year has been devoted largely to problems of national defense, including work on the electronic computer, electronic miniaturization and printed circuits, and development of an all-glass filter paper.

THE BUILDER: A Biography of Ezra Cornell—Philip Dorf—*Macmillan*, 459 p., illus., \$5.00. This life of the founder of Cornell University also tells the story of developing America.

THE CHEMISTRY OF SYNTHETIC DYES, Volume II—K. Venkataraman—*Academic Press*, 737 p., \$15.00. A technical work by the director of the department of chemical technology of the University of Bombay.

THE CHICK EMBRYO IN BIOLOGICAL RESEARCH—M. E. Rawles and D. A. Karnofsky, Chairmen—*New York Academy of Sciences*, 307 p., illus.,

paper, \$4.00. Selections were chosen to provide researchers with information essential for the proper use of an organism as a research tool.

A COLLECTION OF BIRDS FROM MOUNT CAMEROON—Rudyard Boulton and A. L. Rand—*Chicago Natural History Museum*, 29 p., paper, 40 cents. Mount Cameroon rises from the sea to a peak of 13,353 feet just about 4 degrees north of the equator. Some of the birds collected are never found at lower altitudes than near its peak.

COLLOID SCIENCE: Volume I, Irreversible Systems—H. R. Kruyt, Ed.—*Elsevier Publishing Company*, 389 p., illus., \$11.00. To serve as a guide to colloid science, stressing the harmony that exists between classical colloid science and the field of macromolecular systems. This volume completes the work, the second volume of which appeared in 1949.

THE COMPOSITION OF THE SANITARY ENGINEERING PROFESSION—Walter A. Lyon and Arthur P. Miller—*Govt. Printing Office*, Scientific Manpower Series No. 2, 36 p., paper, 15 cents. Many sanitary engineers currently practicing have had little formal sanitary engineering education. There are about 5,000 in this profession in the United States.

DESIGN OF NAILED STRUCTURES—E. George Stern and Paul W. Stoneburner—*Virginia Polytechnic Institute*, Engineering Experiment Station Series No. 81, 67 p., illus., paper, 75 cents. How to plan joints so as to insure maximum strength as the wood seasons and ages.

DEVELOPMENT OF THE GUIDED MISSILE—Kenneth W. Gatland—*Philosophical Library*, 133 p., illus., \$3.75. On the guided missile as a weapon as well as on rockets for high-altitude research, space satellite vehicles and interplanetary flight. Most of the material appeared originally as a series of articles in the British journal *Flight*.

EFFECTS OF COMMUNITY-WIDE INSTALLATION OF HOUSEHOLD GARBAGE-GRINDERS ON ENVIRONMENTAL SANITATION—George K. Erganian, Walter G. Belter and Ralph C. Graber—*Govt. Printing Office*, Public Health Service Publication No. 224, 41 p., paper, 20 cents. Driven by necessity caused by an epidemic of hog disease, Jasper, Ind., householders decided to eliminate the garbage can. Results, reported here, show incidental benefits to be reduction in flies and rats.

ERIC SLOANE'S WEATHER BOOK—Eric Sloane—*Duell Sloan and Pearce and Little, Brown*, 90 p., illus., \$3.75. A readable book about the science and folklore of the atmosphere and weather.

THE FACE OF THE ARCTIC: A Cameraman's Story in Words and Pictures of Five Journeys Into the Far North—Richard Harrington—*Schuman*, 369 p., illus., \$6.00. Beautiful photographs and graphic narrative combine to show what the cold world near the north pole is like.

FINANCIAL STATUS AND NEEDS OF DENTAL SCHOOLS—Walter J. Pelton and others—*Govt. Printing Office*, Public Health Service Publica-

tion No. 200, 83 p., illus., paper, 25 cents. The United States has 40 dental schools located in 23 states; only 15 operate under public control.

GENERAL SCIENCE WORKBOOK: Demonstrations and Exercises—A. J. Burdick and J. J. Dudleston—*Oxford Book Company*, rev. ed., 224 p., illus., paper, \$1.15. Can be used conveniently with any text and follows closely the New York State syllabus. The "Experiences of Jim Keen," following each topic provide applications of what is learned.

THE JOURNAL OF CLINICAL NUTRITION: An International Journal Devoted to the Practical Application of Our Newer Knowledge of Nutrition, Volume I, Number 1—S. O. Waife, Ed.—*Nutritional Press*, 90 p., illus., paper, bimonthly, single copies \$1.25, \$6.00 a year. Intended especially for the practicing physician, this journal would also be of interest to anyone concerned with nutrition.

MAN THE CHEMICAL MACHINE—Ernest Borek—*Columbia University Press*, 219 p., \$3.00. Tracing, for the layman, the development of knowledge about the chemistry of the body since urea was synthesized in 1828.

MODERN SCIENCE AND MODERN MAN—James B. Conant—*Columbia University Press*, 111 p., \$2.25. Lectures dealing with the impact of modern science on the ambitions, the hopes, the fears and the outlook of the enlightened citizen of today.

MORE MODERN WONDERS AND HOW THEY WORK—Burr W. Leyson—*Dutton*, 192 p., illus., \$3.50. This group of wonders ranges from the Yale lock to the atomic submarine.

MUTUAL DEFENSE ASSISTANCE CONTROL ACT OF 1951: First Report to Congress, a Program for the Denial of Strategic Goods to the Soviet Bloc—W. A. Harriman—*Govt. Printing Office*, 107 p., paper, 30 cents. Control of East-West trade is a more delicate problem than you might suppose, for the Soviet bloc has goods that the Western nations need.

OIL AND GAS DEVELOPMENTS IN KANSAS DURING 1951—W. A. Ver Wiebe, J. M. Jewett, E. D. Goebel and A. L. Hornbaker—*University of Kansas Publications*, 188 p., illus., paper, 25 cents. Oil production increased 6.1% over 1950 and natural gas production hit an all-time high.

ORCHIDS OF GUATEMALA—Oakes Ames and Donovan Stewart Correll—*Chicago Natural History Museum*, 395 p., illus., paper, \$4.00, Buckram \$5.00. Bringing together for the first time information concerning all the known orchids of Guatemala, 527 species and 25 varieties.

BIOLOGY TEACHERS

You can get better microscopic slides for less! Since comparative histology tells so much about the nature of man, this study should begin early and be enlarged on in the liberal arts and teachers colleges, and in the university. Like English, it should be a required study for all students in every school of intermediate and higher education. The result would be a better citizenry: better parents, better teachers, better preachers, better physicians, a better man, and a better society, which is the purpose of education. Premedical students should make comparative histology their biggest course, because the medical schools devote very little time to the study of this most important discipline. The medical students should realize that knowledge of cellular biology gives meaning to pathology, anatomy and physiology and is the natural and least costly approach to all medical problems. *Begin study histology in high school.*
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PRIMITIVE FOSSIL GASTROPODS AND THEIR BEARING ON GASTROPOD CLASSIFICATION—J. Brookes Knight—*Smithsonian*, 56 p., illus., paper, 60 cents. A classification that attempts to give full weight to paleontological data as well as to knowledge of the living animal.

THE SANITARY LANDFILL METHOD OF REFUSE DISPOSAL IN NORTHERN STATES—Leo Weaver and Donald M. Keagy—*Govt. Printing Office*, Public Health Service Publication No. 226, 31 p., illus., paper, 20 cents. Where suitable land is available, the sanitary landfill is the most economical method of refuse disposal even in northern states where the ground is frozen in winter.

SHOCK SYNDROME—John Scudder, Chairman—*New York Academy of Sciences*, 197 p., illus., paper, \$3.75. Discussing various aspects of the problem of shock, plasma substitutes and expanders.

TABLES OF GENERAL PERTURBATIONS FOR A GROUP OF MINOR PLANETS WHICH INCLUDES THE GROUP ONE-HALF WITH APPLICATIONS TO THIRTY-FOUR CASES—Sophia Levy McDonald and Armin Otto Leuschner—*University of California Press*, 210 p., paper, \$7.50. Modification and simplification of tables published in 1922.

THE TAMING OF THE NATIONS: A Study of the Cultural Bases of International Policy—F. S. C. Northrop—*Macmillan*, 362 p., \$5.00. National self-interest, the author points out, will no longer work in foreign affairs, and international relations must become more than an art; it must also be a science.

TELEVISION IN EDUCATION: A Summary Report, preprinted from the Complete Proceedings of the Educational Television Programs Institute Held at Pennsylvania State College, April 20-24, 1952, Carroll V. Newsom, Director—*American Council on Education*, 35 p., paper, free upon request direct to publisher, 1785 Massachusetts Ave., N. W., Room 110, Washington 6, D. C.

THEORY AND PRACTICE IN STREAM POLLUTION CONTROL—Richard D. Hoak—*Mellon Institute*, 9 p., illus., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. Two kinds of measures are recommended: reducing pollution at its source and appropriate treatment of residual wastes.

THE TROPICAL RAIN FOREST: An Ecological Study—P. W. Richards—*Cambridge University Press*, 450 p., illus., \$12.50. Telling with minimum of technical terms of the abundant life in the tropical rain forest.

Science News Letter, November 15, 1952

ASTRONOMY

25-Foot Radio Telescope

Instrument at Harvard Observatory will explore our galaxy, concentrating on the extremely rarefied hydrogen clouds that radiate at 21 centimeters.

► A 25-FOOT radio telescope, to be used particularly in exploring the structure of our Milky Way galaxy, is being constructed for the Agassiz Station of Harvard Observatory.

Weighing about 800 pounds, the dish-shaped antenna will be built in one piece—an aluminum frame covered with aluminum mesh. Because it cannot be covered, the radio telescope will be built to withstand high wind velocities.

Radio astronomy is particularly useful in the study of the great clouds of neutral hydrogen that float in our galaxy and emit no light at all. Extremely rarefied by earth standards, these invisible clouds have only about one atom per cubic centimeter. Yet the city of stars to which the earth belongs is so many million billion miles across and the hydrogen clouds are so numerous that they probably contain as much matter as all the stars in the galaxy combined.

These hydrogen clouds, which radiate at a wavelength of 21 centimeters, were first detected last year by Prof. Edward M. Purcell of the Harvard physics department (see p. 307) and Dr. Harold I. Ewen, now of the Observatory. The new radio astronomy program will be directed by Prof. Bart J.

Bok of Harvard Observatory, who has made the structure of our galaxy one of his specialties, and Dr. Ewen.

The radiation from these hydrogen clouds arises when the single electron of the hydrogen atom, moving around the proton nucleus, reverses its spin. At that instant it emits a quantum, or burst, of energy. This occurs only about once every 400 years in an individual hydrogen atom, but because of the great number of atoms in the vast interstellar clouds, the radiation is effectively continuous.

Astronomers hope that by tracing these hydrogen clouds they may be able to determine the structure of our galaxy. The clouds are generally thought to be much denser in the spiral arms of the galaxy than in the regions that are near the galactic center.

Science News Letter, November 15, 1952

Questions

AERONAUTICS—What are the advantages of flying Arctic routes between North America and Europe or Asia? p. 308.

• • •

ANTHROPOLOGY—Where did man's fore-runners live? p. 314.

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ASTRONOMY—What is the life expectancy of our sun? p. 312.

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ELECTRONICS—Why is TV not practical for automobiles? p. 310.

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ENTOMOLOGY—How can narcissus bulbs be kept maggot-free? p. 309.

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GENERAL SCIENCE—What science problems face President-elect Eisenhower? p. 316.

• • •

NUTRITION—Why is vitamin C a daily diet must? p. 312.

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Photographs: Cover, Fremont Davis; p. 306, Stanford University; p. 307, United Press-Photo; p. 309, Robert H. Simpson; p. 310, Northrop Aircraft, Inc.; p. 311, U. S. Air Force; p. 315, Henry C. Gibson; p. 320, Thatcher Glass Manufacturing Company, Inc.

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For addresses where you can get more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C., and ask for Gadget Bulletin 648. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

❁ **TOY HOLDER**, built of a sturdy metal, will accommodate about 100 pounds of toys. Supported on four swivel ball-bearing casters, the cart-like unit can be rolled easily over rugs. Rubber bumpers protect any furniture that might get in Junior's way while he carts his toys back to his room.

Science News Letter, November 15, 1952

❁ **"MILK BOX,"** set outside the house, gives the milkman a place to leave milk when the housewife is not at home to bring it inside. The metal box, well insulated with vermiculite, protects the milk for several hours from biting cold or tepid heat, and is available in four-, six and eight-bottle sizes.

Science News Letter, November 15, 1952

❁ **LIFE PRESERVER**, handy for duck hunters, is small enough to be carried in a pocket. When squeezed, the unit inflates into a brilliant yellow plastic tube four feet long which can give support to two average-sized men. The palm-sized unit can be tossed to persons in distress and will float even when not inflated.

Science News Letter, November 15, 1952

❁ **BASKET HOLDER** for glass ovenware eliminates the necessity of protecting tables from the hot casserole. The woven baskets, imported from Spain, come in various



sizes and shapes with matching glass baking dishes, as shown in the photograph. The baskets may also be used as serving pieces for hot rolls, cookies and other foods.

Science News Letter, November 15, 1952

❁ **ENGRAVING MACHINE**, especially designed for small weekly newspapers, makes cuts directly from photographs.

Burning the picture into a plastic mat with a hot stylus, the table-top engraving machine can produce an 85-screen, four-column halftone in 24 minutes.

Science News Letter, November 15, 1952

❁ **ELECTRIC CORD HOLDER** eliminates the unsightly tangle of excess lamp cords at wall sockets. Consisting of a "reel" and a cylindrical case, a single unit can take up as much as nine feet of slack cord, presenting a neat appearance to the housewife and her guests.

Science News Letter, November 15, 1952

❁ **BASEBALL GAME**, an ideal present for sports-minded children, has life-like players that are moved around the diamond by magnetic control rods under the game board. Complete with bleacher background, the non-electric game provides youngsters with many thrills of real-life contests.

Science News Letter, November 15, 1952

❁ **MULTI-PURPOSE POWER TOOL** for woodworking hobbyists who have no space for an extensive work shop combines a circular saw, drill press, jointer and sander into a powered unit only three feet square. The machine can be changed from one tool to another in about a minute's time and with little effort.

Science News Letter, November 15, 1952

• Nature Ramblings •

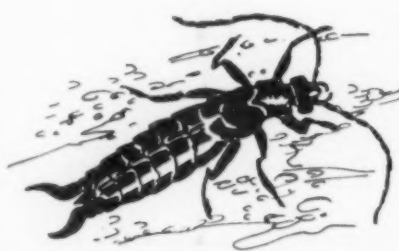
➤ **ONE OF** the most curiously misnamed insects in existence is the earwig. Few of us ever get to see earwigs, but that is only because we do not hunt for these curious creatures.

Even now, late autumn though it is, we can find them by turning up old boards or stones, pulling cattails to pieces, and by prying into cracks and crannies generally. For the earwigs hibernate, and we have only to break their secret doors down to find them at home.

This house-and-grounds pest has been increasing in numbers lately. A reddish-brown, six-legged insect, the earwig grows to about three-fourths of an inch long, and is distinguished by formidable-looking rear forceps and a foul odor.

Earwigs in and around the house generally are more troublesome than destructive, but they often damage flower and vegetable plants in gardens or feed on ripe fruit. This summer considerable earwig damage to apricots, raspberries and gardens was reported from Utah as well as a great increase in these pests in parts of California.

Earwig



Earwigs may carry disease because they frequent unsanitary places and then visit home pantries as freely as parlors. But the entomologists never have found any basis for the old superstition that they have a habit of crawling into ears.

Earwigs probably first immigrated to the U. S. as stowaways in baggage of European travelers between 1910 and 1920, a time when the pests were especially numerous in North Europe. They have spread in this country by the same method—in baggage,

bundles of newspapers and shipments of merchandise.

Up to this year, they had been reported in a dozen states—Massachusetts, Rhode Island, Connecticut, New York, Colorado, Idaho, Montana, Utah, Nevada, Oregon, Washington, California.

Recently, they have been reported in Pennsylvania and New Hampshire, seem to be spreading around the Boston area and increasing in several western States. They nest in the ground and need moisture, so climate has some effect on their survival.

The simplest method of control is to use DDT, chlordane dusts or residual sprays along fences, woodpiles or other outdoor hiding places, or in cracks and crannies where they hide in the house. Poison baits also may be used. A new Department of Agriculture folder tells how.

Single copies of "The European Earwig and Its Control" (EC-25) may be obtained from the Office of Information, U. S. Department of Agriculture, Washington 25, D. C.

Science News Letter, November 15, 1952